

## The History of the 2023 Nobel Prize in Medicine and Advancements in Nucleoside Base Modifications and mRNA Vaccine Development

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The development of effective mRNA vaccines against COVID-19 is a highly significant scientific and medical achievement. This achievement undoubtedly resulted from the collaborative efforts of numerous teams of researchers and scientists in various fields. The mRNA vaccines represent a new class of vaccines that harness the body's cellular machinery to produce specific antigens, which will trigger the immune responses against the produced antigens. The recent 2023 Nobel Prize in Physiology or Medicine was awarded to Katalin Karikó and Drew Weissman for their discoveries related to fundamental nucleotide changes that enabled the development of effective mRNA vaccines against COVID-19. The groundbreaking findings have fundamentally changed our understanding of how mRNA interacts with our immune system, contributing to the unprecedented rate of vaccine development during one of the greatest threats to human health in modern times. The use of nucleoside-modified mRNA for the development of mRNA vaccines remains an outstanding question with important implications for vaccine development. mRNA vaccines are a promising approach as the production process is simple, safety profiles are better than those of DNA vaccines, and these vaccines offer flexibility with respect to development. The history of mRNA vaccine technology goes back decades; however, it was in recently that companies and governments spending large budget on it. The Nobel Prize in Medicine for 2023 highlights the significant impact of advancements in nucleotide changes and mRNA vaccine development on medicine and public health, particularly during the COVID-19 pandemic. Here, the fundamental advancements related to nucleotide changes and their role in developing mRNA vaccines is mentioned. We will also delve into the history of the Nobel Prize in Medicine and, finally, explore the history of the research and its progress over time, along with the potential applications of this knowledge in the future.

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